

Application No. 09/852,709
Docket No. ACT 201/ Shipley 03-10

Art Unit 2874
Examiner Michael J. Stahl

3. (Amended Twice) An optical switch assembly comprising:

a fixed optical array;
a movable optical array;
a plurality of first optical fibers mounted on said fixed optical array and a plurality of second optical fibers mounted on said movable optical array; and
a mounting apparatus comprising a plurality of mounting structures, wherein said fixed optical array is immobile relative to said mounting apparatus and said movable optical array is movable along side mounting apparatus, and
wherein said fixed optical array comprises an upper chip mated to a lower chip, said chips comprising grooves which mate to receive said first optical fibers and cut-in portions which create a notch between said upper and lower chips, and said movable optical array comprises an upper chip mated to a lower chip, said chips comprising grooves which mate to receive said second optical fibers and cut-in portions which create a notch between said upper and lower chips.

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5. (Amended Once) An optical switch assembly comprising:

a fixed optical array comprising at least one chip with a plurality of first and second grooves;

a movable optical array comprising at least one chip with a plurality of first and second grooves;

a plurality of first optical fibers mounted on said fixed optical array and a plurality of second optical fibers mounted on said movable optical array, wherein said first grooves of said fixed optical array are adapted to receive said first optical fibers and said first grooves of said movable optical array are adapted to receive said second optical fibers; and

a mounting apparatus comprising a plurality of mounting structures, said fixed optical array being immobile relative to said mounting apparatus and said movable optical array being movable along said mounting apparatus, wherein said second grooves of said fixed optical array are adapted to receive said mounting structures and said second grooves of said movable optical array are adapted to receive said mounting structures.

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6. (Amended Once) The optical switch assembly of claim 5, wherein said mounting structures comprise at least one member chosen from rails, fibers, and spheres.

11. (Amended Once) The optical switch assembly of claim 7, wherein said substrate comprises an opening.

16. (Amended Once) The optical switch assembly of claim 7, wherein said substrate comprises a first plurality of grooves and a second plurality of grooves extending in a transverse direction to said first plurality of grooves.

26. (Amended Twice) The method of claim 25, wherein said first and second support structures each comprise upper and lower support portions, each said portion comprising a pair of said cut-in portions, wherein said cut-in portions of said upper support portion mate with said cut-in portions of said lower support portion to create notches for receiving said pair of fibers.

B 27. (Amended Twice) The method of claim 20, further comprising preparing said mounting apparatus, comprising:

providing a first plurality and second plurality of grooves in a base structure, said first plurality of grooves being transverse to said second plurality of grooves;

positioning a plurality of mounting structures within said base structure grooves; and

affixing one of said first and second support structures to said mounting structures in said first plurality of grooves in said base structure.

30. (Amended Once) An optical switch assembly comprising:

a mounting apparatus;

a fixed optical array comprising at least one chip with a plurality of first and second grooves, said fixed optical array being immobile relative to said mounting apparatus;

a movable optical array comprising at least one chip with a plurality of first and second grooves, said movable optical array being movable along said mounting apparatus

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along the direction of the longitudinal axis of a selected one of said second grooves of the movable array;
a plurality of first optical fibers mounted in said first grooves of said fixed optical array;
and
a plurality of second optical fibers mounted in said first grooves of said movable optical array.

31. (Amended Once) The optical switch assembly of claim 30, wherein said mounting apparatus comprises a plurality of mounting structures which comprise at least one member chosen from rails, fibers, and spheres and wherein a respective mounting structure is engaged with a respective second groove of the fixed and movable arrays.

B¹ 40. (Amended Once) The optical switch assembly of claim 31, wherein said substrate comprises a first plurality of grooves and a second plurality of grooves extending in a transverse direction to said first plurality of grooves.

{ Please add new claims 43-58. }

43. (New) An optical switch assembly comprising:

a first waveguide holding member holding an optical waveguide, the optical waveguide having an endface disposed at an angle relative to the optical axis of the waveguide such that an axial ray incident on the endface substantially undergoes total internal reflection when the switch is in the open position;

a second waveguide holding member holding an optical waveguide, the optical waveguide of the second waveguide holding member having an endface disposed at an angle relative to the optical axis of the waveguide of the second waveguide holding member such that an axial ray incident on the endface of the waveguide of the second waveguide holding member substantially undergoes total internal reflection when the switch is in the open position; and

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a base comprising a mounting structure onto which the first and second waveguide holding members are disposed so that at least a selected one of the first and second waveguide holding members may be moved relative to the other waveguide holding member along a selected path to effect switching of the switch.

44. (New) The optical switch according to claim 43, wherein the endface of the optical waveguide of the first waveguide holding member is disposed in a plane parallel to the plane containing the endface of the optical waveguide of the second waveguide holding member.

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45. (New) The optical switch according to claim 44, wherein the selected waveguide holding member is movable relative to the other waveguide holding member so that the respective waveguide end faces of the first and second waveguide holding members may be positioned sufficiently close so as to frustrate the total internal reflection at the waveguide end faces to effect optical coupling between the optical waveguides of the first and second waveguide holding members.

46. (New) The optical switch according to claim 45, wherein the selected waveguide holding member is slidably disposed on the mounting structure.

47. (New) The optical switch according to claim 45, wherein the optical axes of the optical waveguides are collinear.

48. (New) The optical switch according to claim 45, wherein the mounting structure comprises at least one protrusion and the waveguide holding members each comprise a groove slidably engaged with the protrusion.

49. (New) The optical switch according to claim 48, wherein the protrusion comprises at least one member chosen from a rail, a sphere, and a fiber.

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50. (New) The optical switch according to claim 45, wherein the waveguide holding members each comprise at least one protrusion and the mounting structure comprises a groove engaged with the protrusions.

51. (New) The optical switch according to claim 50, wherein the protrusion comprises at least one member chosen from a rail, a sphere, and a fiber.

52. (New) The optical switch according to claim 45, wherein the path extends along the direction of the optical axis of the optical waveguide of the first waveguide holding member.

53. (New) The optical switch according to claim 45, wherein the path extends along a direction perpendicular to the optical axis of the optical waveguide of the first waveguide holding member.

54. (New) The optical switch according to claim 45, wherein the first and second waveguide holding members each comprise a micromachined silicon chip.

55. (New) The optical switch according to claim 54, wherein the waveguides of each waveguide holding member comprise an optical fiber and the silicon chips each comprise a V-groove in which a respective one of the optical fibers is disposed.

56. (New) The optical switch according to claim 54, wherein the silicon chips each comprise a V-groove disposed in engagement with the mounting structure.

57. (New) The optical switch according to claim 56, wherein the mounting structure comprises at least one member chosen from a rail, a sphere, and a fiber.

58. (New) The optical switch according to claim 56, wherein the base comprises a V-groove silicon chip and the mounting structure comprises at least one of a sphere or a fiber disposed in the V-groove of the base.